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# 4, 7TH MAIN MALLESWARAM, BANGALORE -3

Certificate No.: TC-5548

Format No: CP/TF/01

# TEST REPORT OF PHYSICAL PROPERTIES OF CEMENT - 53 Grade

Lab ID : CP-2020-01-09-29 Date: 11-11-19  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 08-11-19  
Sample Type : Birla Super 53grade  
Reference to BIS codes : IS 12269 : 2013, 53 Grade Ordinary Portland cement Specification ,  
IS 4031 (Part 1,2,3,4,5, 6,11):1988  
IS 4031 Part 1 DETERMINATION OF FINENESS BY DRY SIEVING, Clause 4.4  
IS 4031 Part 2, Determination of Fineness by Blaine Air Permeability Method, Clause 5  
IS 4031 Part 3, Determination of Soundness, Clause 5, Clause 6  
IS 4031 Part 4, Determination of Consistency of Standard Cement Paste, Clause 5  
IS 4031 Part 5, Determination of Initial & Final Setting Time, Clause 5  
IS 4031 Part 11, DETERMINATION OF DENSITY , Clause 6  
Date of test : 09-11-19

Environmental Conditions during test : Temperature: 26°C  
Humidity: 72%

| Sl.No. | Physical properties                                           | Results     | Requirement as per IS 12269: 2013 |
|--------|---------------------------------------------------------------|-------------|-----------------------------------|
| 1      | Fineness by dry sieving (%)                                   | 1.95        | -                                 |
| 2      | Fineness by Air permeability method (m <sup>2</sup> /kg, Min) | 285.4       | 225m <sup>2</sup> /kg, Min        |
| 3      | Density (gm/cc)                                               | 3.12        | -                                 |
| 4      | Standard Consistency (%)                                      | 29.5%       | Not specified                     |
| 5      | Initial Setting time                                          | 145 minutes | Not less than 30 minutes          |
| 6      | Final Setting time                                            | 240 minutes | Not more than 600 minutes         |
| 7      | Soundness (Le Chatelier's Method)                             | 1.5mm       | Not more than 10 mm               |

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## TEST REPORT ON COARSE AGGREGATES

Lab ID : CP-2020-01-09-29 Date: 11-11-19  
Project Name : Improvements to roads and drains at Manavarthi Thota,  
Kamakshamma layout layout Kondappa layout SC-ST areas in  
Agency : Ward No. 02 of Yelahanka Sub division  
M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th  
Main shivakumar swamy building, Bhashyam Circle  
Customer's Reference : Bangalore:560010  
Date of Receipt : BBMP/EE/YNK.D/W.O/000155/2019-20  
Sample Type : 08-11-19  
Reference to BIS codes : 40mm down size coarse aggregate  
IS: 383:2016 (Specification for Coarse and fine Aggregates )  
IS: 2386 :1963(Part - 1,3,4) RA2011  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption  
IS 2386 Part 4: Mechanical Properties  
Date of test : 08-11-19

### SIEVE ANALYSIS (PARTICLE SIZE DISTRIBUTION) OF 40MM DOWN COARSE AGGREGATE:

Total weight taken

: 15000 grams

| Sample No. | Sieve No. | Weight Retained in gms | Cumulative Weight Retained in gms | % Cumulative Weight Retained | % Passing | Required as per IS 383:2016 |
|------------|-----------|------------------------|-----------------------------------|------------------------------|-----------|-----------------------------|
| 1          | 80 mm     | 0                      | 0                                 | 0.0                          | 100       | 100                         |
| 2          | 40 mm     | 244                    | 244                               | 1.6                          | 98.4      | 90-100                      |
| 3          | 20 mm     | 5432                   | 5676                              | 37.8                         | 62.2      | 30-70                       |
| 4          | 10 mm     | 4332                   | 10008                             | 66.7                         | 33.3      | 10-35                       |
| 5          | 4.75 mm   | 4654                   | 14662                             | 97.7                         | 2.3       | 0-5                         |
| 6          | Pan       | 338                    | 15000                             | 100.0                        | 0         | ---                         |

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### TEST REPORT ON COARSE AGGREGATES

Lab ID : CP-2020-01-09-29 Date: 11-11-19  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 08-11-19  
Sample Type/ Size : 20mm down size coarse aggregate  
Reference to BIS codes : IS: 383:2016 (Specification for Coarse and fine Aggregates )  
IS: 2386 :1963(Part - 1,3,4) RA2011  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption  
IS 2386 Part 4: Mechanical Properties  
Date of test : 08-11-19

### SIEVE ANALYSIS (PARTICLE SIZE DISTRIBUTION) OF 20MM DOWN COARSE AGGREGATE:

Total weight taken : 5000 grams

| Sample No. | Sieve No. | Weight Retained in gms | Cumulative Weight Retained in gms | % Cumulative Weight Retained | % Passing | Required as per IS 383:2016 |
|------------|-----------|------------------------|-----------------------------------|------------------------------|-----------|-----------------------------|
| 1          | 40 mm     | 0                      | 0                                 | 0                            | 100       | 100                         |
| 2          | 20 mm     | 199                    | 199                               | 4.0                          | 96.0      | 90-100                      |
| 3          | 10 mm     | 3050                   | 3249                              | 65.0                         | 35.0      | 25-55                       |
| 4          | 4.75 mm   | 1502                   | 4751                              | 95.0                         | 5.0       | 0-10                        |
| 5          | Pan       | 249                    | 5000                              | 100                          | 0         | -                           |

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## TEST REPORT OF FINE AGGREGATE

Lab ID

: CP-2020-01-09-29

Date: 11-11-19

Project Name

: Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division

Agency

: M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010

Customer's Reference

: BBMP/EE/YNK.D/W.O/000155/2019-20

Date of Receipt

: 08-11-19

Sample Type

: Fine Aggregate

Reference to BIS codes

: IS 383 : 2016 (Specification for Coarse and fine Aggregates)  
IS: 2386 :1963(Part - 1, 3) RA2012  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption

Date of test

: 08-11-19

Total weight taken

: 1000 grams

| SLno | Sieve Size | Weight Retained (gms) | Cumulative Weight Retained (gms) | % Cumulative Weight Retained | % Passing | Requirement as per IS 383:2016 |                 |                  |                 |
|------|------------|-----------------------|----------------------------------|------------------------------|-----------|--------------------------------|-----------------|------------------|-----------------|
|      |            |                       |                                  |                              |           | Grading Zone I                 | Grading Zone II | Grading Zone III | Grading Zone IV |
| 1    | 10 mm      | 0                     | 0                                | 0.0                          | 100.0     | 100                            | 100             | 100              | 100             |
| 2    | 4.75 mm    | 28                    | 28                               | 2.8                          | 97.2      | 90-100                         | 90-100          | 90-100           | 95-100          |
| 3    | 2.36 mm    | 48                    | 76                               | 7.6                          | 92.4      | 60-95                          | 75-100          | 85-100           | 95-100          |
| 4    | 1.18 mm    | 227                   | 303                              | 30.3                         | 69.7      | 30-70                          | 55-90           | 75-100           | 90-100          |
| 5    | 600 micron | 200                   | 503                              | 50.3                         | 49.7      | 15-34                          | 35-59           | 60-79            | 80-100          |
| 6    | 300 micron | 202                   | 705                              | 70.5                         | 29.5      | 5-20                           | 8-30            | 12-40            | 15-50           |
| 7    | 150 micron | 207                   | 912                              | 91.2                         | 8.8       | 0-10                           | 0-10            | 0-10             | 0-15            |
| 8    | Pan        | 88                    | 1000                             | 100.0                        | 0.0       | ---                            | ---             | ---              | ---             |

Result : The tested Sample Conforms to Grading Zone II

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## TEST RESULTS OF STEEL

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 12-11-19  
Sample Type : Sunvik  
Reference to BIS codes : IS 1786-2008, IS:1608-2005(RA 2011), IS 1599-2012.  
Date of test: : 12-11-19

| Sl.No | Identification of sample | Grade of the sample | Diameter of the steel bar | Weight of the sample | Yield stress         | Tensile strength     | Elongation | Bend test    | Rebend test  |
|-------|--------------------------|---------------------|---------------------------|----------------------|----------------------|----------------------|------------|--------------|--------------|
|       |                          |                     | (mm)                      | (kg/m)               | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> ) | (%)        |              |              |
| 1     | Sunvik                   | Fe500               | 8                         | 0.391                | 512                  | 652                  | 20.0%      | Satisfactory | Satisfactory |
| 2     | Sunvik                   | Fe500               | 10                        | 0.616                | 528                  | 672                  | 20.0%      | Satisfactory | Satisfactory |
| 3     | Sunvik                   | Fe500               | 12                        | 0.888                | 544                  | 668                  | 20.0%      | Satisfactory | Satisfactory |
| 4     | Sunvik                   | Fe500               | 16                        | 1.581                | 572                  | 674                  | 19.0%      | Satisfactory | Satisfactory |

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## TEST REPORT OF PRECAST COVER SLAB

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 19-11-19  
Sample Type /Size : Precast Cover Slab(100mm)  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete  
Date of test : 19/11/2019

| SL No. | Identification Mark | Diameter of the core | Height of the core | Weight of the core | Area    | Failure Load | Core Compressive strength | Corrected Cylinder Compressive strength | Equivalent Cube Compressive strength |
|--------|---------------------|----------------------|--------------------|--------------------|---------|--------------|---------------------------|-----------------------------------------|--------------------------------------|
|        |                     | (mm)                 | (mm)               | (kg)               | (Sq.mm) | (KN)         | (N/mm <sup>2</sup> )      | (N/mm <sup>2</sup> )                    | (N/mm <sup>2</sup> )                 |
| 1      | Cover Slab-1        | 75.5                 | 100.49             | 1.112              | 4476    | 80.7         | 18.0                      | 16.8                                    | 21.0                                 |
| 2      | Cover Slab-2        | 75.48                | 100.54             | 1.124              | 4474    | 82.5         | 18.4                      | 17.2                                    | 21.4                                 |
| 3      | Cover Slab-3        | 75.52                | 100.52             | 1.116              | 4478    | 81.7         | 18.2                      | 17.0                                    | 21.2                                 |

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## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout  
Agency : SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Customer's Reference : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building,  
Date of Receipt : BBMP/EE/YNK.D/W.O/000155/2019-20  
Customer ID : 18-11-19  
Sample Type /Size : Drain Bottom Slab Concrete  
Sample grade/Age : 150X150X150 mm  
Reference to BIS codes : M20 / 7 Days Compressive Strength  
IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

Date of test : 22/11/2019

| Sl. No. | Identification Mark        | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen      | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|---------|----------------------------|-------------------|-----------------|-----------------|--------------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|         |                            |                   |                 |                 | (mm)                           | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1       | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 151.84 X<br>149.11 X<br>151.77 | 22641                | 8.624                | 422.2        | 18.6                 | 18.7                         |
| 2       | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 149.51 X<br>149.56 X<br>151.77 | 22361                | 8.078                | 421.7        | 18.9                 |                              |
| 3       | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 149.02 X<br>149.32 X<br>150.31 | 22251                | 8.995                | 415.0        | 18.7                 |                              |

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## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29 Date: 22/11/2019  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 18-11-19  
Customer ID : Drain Bottom Slab Concrete  
Sample Type /Size : 150X150X150 mm  
Sample grade/Age : M20 / 7 Days Compressive Strength  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5  
Date of test : 22/11/2019

| SL No. | Identification Mark        | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|----------------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                            |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 149.01 X                  | 22350                | 8.624                | 406.7        | 18.2                 | 18.3                         |
|        |                            |                   |                 |                 | 149.99 X                  |                      |                      |              |                      |                              |
|        |                            |                   |                 |                 | 150.41                    |                      |                      |              |                      |                              |
| 2      | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 149.57 X                  | 22459                | 8.078                | 413.7        | 18.4                 |                              |
|        |                            |                   |                 |                 | 150.16 X                  |                      |                      |              |                      |                              |
|        |                            |                   |                 |                 | 150.50                    |                      |                      |              |                      |                              |
| 3      | Drain Bottom Slab Concrete | M20               | 15/11/2019      | 22/11/2019      | 151.14 X                  | 22788                | 8.995                | 413.7        | 18.2                 |                              |
|        |                            |                   |                 |                 | 150.78 X                  |                      |                      |              |                      |                              |
|        |                            |                   |                 |                 | 149.24                    |                      |                      |              |                      |                              |

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## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29 Date: 26/11/2019  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 21-11-19  
Customer ID : Drain Side Wall Concrete  
Sample Type /Size : 150X150X150 mm  
Sample grade/Age : M20 / 7 Days Compressive Strength  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5  
Date of test : 26/11/2019

| SL No. | Identification Mark      | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|--------------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                          |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 149.11 X                  | 22605                | 8.624                | 418.3        | 18.5                 | 18.5                         |
|        |                          |                   |                 |                 | 151.61 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 149.77                    |                      |                      |              |                      |                              |
| 2      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 151.03 X                  | 22516                | 8.078                | 420.3        | 18.7                 |                              |
|        |                          |                   |                 |                 | 149.08 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 149.88                    |                      |                      |              |                      |                              |
| 3      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 150.28 X                  | 22497                | 8.995                | 412.3        | 18.3                 |                              |
|        |                          |                   |                 |                 | 149.70 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 149.57                    |                      |                      |              |                      |                              |

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Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 21-11-19  
Customer ID : Drain Side Wall Concrete  
Sample Type /Size : 150X150X150 mm  
Sample grade/Age : M20 / 7 Days Compressive Strength  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete CI 5  
Date of test : 26/11/2019

| SL No. | Identification Mark      | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|--------------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                          |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 150.63 X                  | 22482                | 8.624                | 410.5        | 18.3                 | 18.2                         |
|        |                          |                   |                 |                 | 149.26 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 150.02                    |                      |                      |              |                      |                              |
| 2      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 149.69 X                  | 22502                | 8.078                | 405.1        | 18.0                 |                              |
|        |                          |                   |                 |                 | 150.32 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 150.30                    |                      |                      |              |                      |                              |
| 3      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 149.64 X                  | 22646                | 8.995                | 412.1        | 18.2                 |                              |
|        |                          |                   |                 |                 | 151.34 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 151.60                    |                      |                      |              |                      |                              |

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## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 21-11-19  
Customer ID : Drain Side Wall Concrete  
Sample Type /Size : 150X150X150 mm  
Sample grade/Age : M20 / 7 Days Compressive Strength  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5  
Date of test : 26/11/2019

| SL No. | Identification Mark      | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen      | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|--------------------------|-------------------|-----------------|-----------------|--------------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                          |                   |                 |                 | (mm)                           | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 151.08 X<br>149.61 X<br>151.77 | 22602                | 8.624                | 410.0        | 18.1                 | 18.2                         |
| 2      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 150.21 X<br>150.58 X<br>151.31 | 22619                | 8.078                | 408.6        | 18.1                 |                              |
| 3      | Drain Side Wall Concrete | M20               | 19/11/2019      | 26/11/2019      | 150.99 X<br>151.86 X<br>150.46 | 22928                | 8.995                | 420.5        | 18.3                 |                              |

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Quality Manager



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## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer's Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 25-11-19  
Customer ID : Culvert Bottom Slab Concrete  
Sample Type /Size : 150X150X150 mm  
Sample grade/Age : M20 / 7 Days Compressive Strength  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5  
Date of test : 29/11/2019

| SL No. | Identification Mark          | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen      | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|------------------------------|-------------------|-----------------|-----------------|--------------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                              |                   |                 |                 | (mm)                           | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 151.90 X<br>150.70 X<br>149.21 | 22891                | 8.624                | 416.2        | 18.2                 | 18.4                         |
| 2      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 150.12 X<br>150.42 X<br>149.01 | 22581                | 8.078                | 424.4        | 18.8                 |                              |
| 3      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 149.69 X<br>149.41 X<br>151.89 | 22365                | 8.995                | 410.3        | 18.3                 |                              |
|        |                              |                   |                 |                 |                                |                      |                      |              |                      |                              |
|        |                              |                   |                 |                 |                                |                      |                      |              |                      |                              |
|        |                              |                   |                 |                 |                                |                      |                      |              |                      |                              |

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## TEST REPORT OF CEMENT CONCRETE CUBES

Date: 29/11/2019

Lab ID : CP-2020-01-09-29  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout  
Agency : SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Customer's Reference : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building,  
Date of Receipt : Bhashyam Circle Bangalore:560010  
Customer ID : BBMP/EE/YNK.D/W.O/000155/2019-20  
Sample Type /Size : Culvert Bottom Slab Concrete  
Sample grade/Age : 150X150X150 mm  
Reference to BIS codes : M20 / 7 Days Compressive Strength  
IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

Date of test : 29/11/2019

| SL No. | Identification Mark          | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen      | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|------------------------------|-------------------|-----------------|-----------------|--------------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                              |                   |                 |                 | (mm)                           | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 151.90 X<br>150.70 X<br>149.21 | 22891                | 8.624                | 416.2        | 18.2                 | 18.4                         |
| 2      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 150.12 X<br>150.42 X<br>149.01 | 22581                | 8.078                | 424.4        | 18.8                 |                              |
| 3      | Culvert Bottom Slab Concrete | M20               | 22/11/2019      | 29/11/2019      | 149.69 X<br>149.41 X<br>151.89 | 22365                | 8.995                | 410.3        | 18.3                 |                              |

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Lab ID

Project Name

Agency

Customer's Reference

Date of Receipt

Customer ID

Sample Type /Size

Sample grade/Age

Reference to BIS codes

## TEST REPORT OF CEMENT CONCRETE CUBES

CP-2020-01-09-29  
Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout  
SC-ST areas in Ward No. 02 of Yelahanka Sub division  
M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building,  
Bhashyam Circle Bangalore:560010  
BBMP/EE/YNK.D/W.O/000155/2019-20  
28-11-19  
Culvert Side Wall Concrete  
150X150X150 mm  
M20 / 7 Days Compressive Strength  
IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5  
03/12/2019

| SL No. | Identification Mark        | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen<br>(mm) | Cross sectional area<br>(Sq.mm) | Weight of the sample<br>(kg) | Failure Load<br>(KN) | Compressive strength<br>(N/mm <sup>2</sup> ) | Average Compressive Strength<br>(N/mm <sup>2</sup> ) |
|--------|----------------------------|-------------------|-----------------|-----------------|-----------------------------------|---------------------------------|------------------------------|----------------------|----------------------------------------------|------------------------------------------------------|
| 1      | Culvert Side Wall Concrete | M20               | 26/11/2019      | 03/12/2019      | 149.89 X<br>151.48 X<br>150.97    | 22705                           | 8.624                        | 421.3                | 18.6                                         | 18.5                                                 |
| 2      | Culvert Side Wall Concrete | M20               | 26/11/2019      | 03/12/2019      | 149.01 X<br>149.36 X<br>151.36    | 22256                           | 8.078                        | 410.9                | 18.5                                         |                                                      |
| 3      | Culvert Side Wall Concrete | M20               | 26/11/2019      | 03/12/2019      | 149.27 X<br>151.58 X<br>151.11    | 22625                           | 8.995                        | 420.8                | 18.6                                         |                                                      |

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Certificate No.: TC-5548

Format No: CP/TF/01

## TEST REPORT OF CEMENT CONCRETE CUBES

Lab ID : CP-2020-01-09-29 Date: 07/12/2019  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout  
Agency : SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Customer's Reference : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building,  
Date of Receipt : BBMP/EE/YNK.D/W.O/000155/2019-20 Bhashyam Circle Bangalore:560010  
Customer ID : 02-12-19  
Sample Type /Size : Cement Concrete Pavement  
Sample grade/Age : 150X150X150 mm  
Reference to BIS codes : M30 / 7 Days Compressive Strength  
Date of test : 1S: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

| SL No. | Identification Mark      | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|--------|--------------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|        |                          |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1      | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 149.73 X                  | 22432                | 8.137                | 568.1        | 25.3                 | 25.3                         |
|        |                          |                   |                 |                 | 149.82 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 149.10                    |                      |                      |              |                      |                              |
| 2      | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 151.21 X                  | 22965                | 8.116                | 604.7        | 26.3                 |                              |
|        |                          |                   |                 |                 | 151.88 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 150.62                    |                      |                      |              |                      |                              |
| 3      | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 151.53 X                  | 22670                | 8.798                | 550.0        | 24.3                 |                              |
|        |                          |                   |                 |                 | 149.61 X                  |                      |                      |              |                      |                              |
|        |                          |                   |                 |                 | 149.91                    |                      |                      |              |                      |                              |

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Lab ID

Project Name

Agency

Customer's Reference

Date of Receipt

Customer ID

Sample Type /Size

Sample grade/Age

Reference to BIS codes

## TEST REPORT OF CEMENT CONCRETE CUBES

CP-2020-01-09-29

Date: 07/12/2019

Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division

M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010

BBMP/EE/YNK.D/W.O/000155/2019-20

02-12-19

Cement Concrete Pavement

150X150X150 mm

M30 / 7 Days Compressive Strength

IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

Date of test

07/12/2019

| : 07/12/2019 |                          |                   |                 |                 |                           |                      |                      |              |                      |                              |
|--------------|--------------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
| SL No.       | Identification Mark      | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|              |                          |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1            | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 149.96 X                  | 22709                | 8.137                | 570.5        | 25.1                 | 25.7                         |
|              |                          |                   |                 |                 | 151.43 X                  |                      |                      |              |                      |                              |
|              |                          |                   |                 |                 | 151.13                    |                      |                      |              |                      |                              |
| 2            | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 150.07 X                  | 22534                | 8.116                | 606.4        | 26.9                 |                              |
|              |                          |                   |                 |                 | 150.15 X                  |                      |                      |              |                      |                              |
|              |                          |                   |                 |                 | 150.01                    |                      |                      |              |                      |                              |
| 3            | Cement Concrete Pavement | M30               | 30/11/2019      | 07/12/2019      | 149.34 X                  | 22289                | 8.798                | 556.3        | 25.0                 |                              |
|              |                          |                   |                 |                 | 149.25 X                  |                      |                      |              |                      |                              |
|              |                          |                   |                 |                 | 151.87                    |                      |                      |              |                      |                              |

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Certificate No.: TC-5548

## TEST RESULTS OF GRADATION FOR WMM

Lab ID :  
Project Name : CP-RW-2020-01-09-29 Date: 27-11-19  
Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 25-11-19  
Type of Mix : WMM ( Wet Mix Macadam)  
Date of test : 25-11-19  
Oven Dry Weight : 11000 Grams

| IS Sieve Size(mm) | Weight Retained (gm) | Cumulative Weight Retained (gm) | % Cumulative Weight Retained | % Passing | Spec.I.Vide Table 400.13 MORTH Specification |
|-------------------|----------------------|---------------------------------|------------------------------|-----------|----------------------------------------------|
| 53                | 0                    | 0                               | 0.0                          | 100.0     | 100                                          |
| 45                | 314                  | 314                             | 2.9                          | 97.1      | 95-100                                       |
| 22.4              | 2258                 | 2572                            | 23.4                         | 76.6      | 60-80                                        |
| 11.2              | 2174                 | 4746                            | 43.1                         | 56.9      | 40-60                                        |
| 4.75              | 2256                 | 7002                            | 63.7                         | 36.3      | 25-40                                        |
| 2.36              | 1625                 | 8627                            | 78.4                         | 21.6      | 15-30                                        |
| 0.6               | 628                  | 9255                            | 84.1                         | 15.9      | 8-22                                         |
| 0.075             | 1336                 | 10591                           | 96.3                         | 3.7       | 0-5                                          |

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## DETERMINATION OF FLAKINESS INDEX AND ELONGATION INDEX OF COARSE AGGREGATE (IS 2386 (Part 1) 1963 (RA 2007))

Lab ID :  
Project Name : CP-RW-2020-01-09-29 Date: 27-11-19  
Improvements to roads and drains at Manavarthi Thota,  
Kamakshamma layout layout Kondappa layout SC-ST areas in  
Agency : Ward No. 02 of Yelahanka Sub division  
M/s. Technical Manager (West), KRIDL, Bangalore, 5th Block 17th  
Main shivakumar swamy building, Bhashyam Circle  
Bangalore: 560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 25-11-19  
Type of Mix : Coarse Aggregate for WMM ( Wet Mix Macadam)  
Date of test : 25-11-19

### Result:

| Index                                           | Percentage of Flakiness and Elongation Index | Secified limits as per MORTH specification table 400-12      |
|-------------------------------------------------|----------------------------------------------|--------------------------------------------------------------|
| Flakiness Index                                 | 12.4%                                        | Combined Flakiness & Elongation Index for WMM is Maximum 35% |
| Elongation Index                                | 12.5%                                        |                                                              |
| Combined Flakiness and Elongation Index for WMM | 24.9%                                        |                                                              |

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Certificate No.: TC-5548

# TEST RESULTS OF GRADATION FOR BC IS 2386 (Part 1) 1963 (RA 2007)

Lab ID : CP-RW-2020-01-09-29 Date: 14-12-19  
Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 12-12-19  
Type of Mix : BC-Plant (Bituminous Concrete)  
Date of test : 12-12-19  
Oven Dry Weight : 5000 Grams

| IS Sieve Size (mm) | Weight Retained (gm) | Comulative Weight Retained (gm) | Comulative % of Retained | Comulative % of Passing | Secified limits as per MORTH specification table 500-17(grading-2) |
|--------------------|----------------------|---------------------------------|--------------------------|-------------------------|--------------------------------------------------------------------|
| 19                 | 0                    | 0                               | 0.0                      | 100.0                   | 100                                                                |
| 13.2               | 88                   | 88                              | 1.8                      | 98.2                    | 90-100                                                             |
| 9.5                | 703                  | 791                             | 15.8                     | 84.2                    | 70-88                                                              |
| 4.75               | 890                  | 1681                            | 33.6                     | 66.4                    | 53-71                                                              |
| 2.36               | 586                  | 2267                            | 45.3                     | 54.7                    | 42-58                                                              |
| 1.18               | 494                  | 2761                            | 55.2                     | 44.8                    | 34-48                                                              |
| 0.6                | 502                  | 3263                            | 65.3                     | 34.7                    | 26-38                                                              |
| 0.3                | 524                  | 3787                            | 75.7                     | 24.3                    | 18-28                                                              |
| 0.15               | 452                  | 4239                            | 84.8                     | 15.2                    | 12-20                                                              |
| 0.075              | 356                  | 4595                            | 91.9                     | 8.1                     | 4-10                                                               |
| PAN                | 405                  | 5000                            | 100                      | 0.0                     | 0                                                                  |

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## TEST REPORT OF AGGREGATE STRIPPING VALUE OF ROAD AGGRGATE (IS:6241)

Lab ID : CP-RW-2020-01-09-29 Date: 16-12-19  
Project Name : Improvements to roads and drains at Manavarthi Thota,  
Kamakshamma layout layout Kondappa layout SC-ST areas in Ward  
No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th  
Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 12-12-19  
Type of Mix : BC(Bitumenous Concrete)  
Date of test : 12-12-19  
Type of Binder : 60/70  
% of Binder Used : 5.0%  
Weight of Aggregate : 200.0 gm  
Weight of Binder : 10.0 gm  
Temperature of water bath : 40°C

| No of test | Retained Stripping Percentage | Stripping Percentage | Average Retained Stripping Percentage | Secified limits as per MORTH specification table 500-8 |
|------------|-------------------------------|----------------------|---------------------------------------|--------------------------------------------------------|
| 1          | 98.0                          | 2.0                  | 98.2                                  | Minimum Retained Coating 95%                           |
| 2          | 98.5                          | 1.5                  |                                       |                                                        |
| 3          | 98.0                          | 2.0                  |                                       |                                                        |

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## PHYSICAL REQUIREMENTS FOR COARSE AGGREGATE FOR BITUMINOUS CONCRETE

Lab ID : CP-RW-2020-01-09-29 Date: 16-12-19  
 Project Name : Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
 Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
 Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
 Date of Receipt : 12-12-19  
 Type of Mix : BC (Bituminous Concrete)  
 Date of test : 12-12-19

Table 500-16 : Physical Requirements for Coarse Aggregate for Bituminous Concrete

| Property         | Test                   | Result | Specification                                               | Method of Test   |
|------------------|------------------------|--------|-------------------------------------------------------------|------------------|
| Partical Shape   | Flakiness Index        | 12.6   | Combined Flakiness & Elongation Index for BC is Maximum 35% | IS:2386 Part I   |
|                  | Elongation Index       | 11.4   |                                                             |                  |
| Strength         | Aggregate Impact Value | 22.2   | Maximum 24%                                                 | IS:2386 Part IV  |
| Specific gravity | Specific gravity       | 2.66   | Maximum 2.7                                                 | IS:2386 Part III |
| Water Absorption | Water Absorption       | 0.22   | Maximum 2%                                                  | IS:2386 Part III |

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Certificate No.: TC-5548

Format No: CP/TF/01

Lab ID

Project Name

Agency

Customer's Reference

Date of Receipt

Sample Type

Reference to BIS codes

Date of test

## TEST REPORT ON BITUMEN

CP-RW-2020-01-09-29 Date: 03-12-19  
Improvements to roads and drains at Manavarthi Thota, Kamakshamma layout Kondappa layout SC-ST areas in Ward No. 02 of Yelahanka Sub division  
M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th Main shivakumar swamy building, Bhashyam Circle Bangalore:560010  
BBMP/EE/YNK.D/W.O/000155/2019-20  
02-12-19  
Bitumen  
IS: 1201-1220(1978) (Reaffirmed-2004)  
02-12-19

### Test Results

| Sl.no | Name of Test                      | Result | Requirements as per IS:73-2013 |
|-------|-----------------------------------|--------|--------------------------------|
| 1     | Penetration at 25°C, in 1/10th mm | 66     | 60 to 70                       |
| 2     | Softening Point, °C               | 51.4   | Min. 40°C                      |
| 3     | Ductility, cm                     | 99     | Min. 75cm                      |
| 4     | Flash point, °C                   | 248    | Min. 220°C                     |
|       | Fire point, °C                    | 274    |                                |

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## DETERMINATION OF RATE OF SPREAD TACK COAT

Lab ID : CP-RW-2020-01-09-29 Date: 23-12-19  
Project Name : Improvements to roads and drains at Manavarthi Thota,  
Kamakshamma layout layout Kondappa layout SC-ST areas in Ward  
No. 02 of Yelahanka Sub division  
Agency : M/s. Technical Manager(West), KRIDL, Bangalore, 5th Block 17th  
Main shivakumar swamy building, Bhashyam Circle  
Bangalore:560010  
Customer Reference : BBMP/EE/YNK.D/W.O/000155/2019-20  
Date of Receipt : 21-12-19  
Type of Mix : Tack coat  
Date of test : 21-12-19

| Sl.No | Determination                                            | Unit    | TEST 1        | TEST 2     |
|-------|----------------------------------------------------------|---------|---------------|------------|
| 1     | Size of Plate (mxm)                                      | Mt      | 0.30 x .30    | 0.30 x .30 |
| 2     | Area of Plate (a)                                        | Sq.mtr  | 0.09          | 0.09       |
| 3     | Initial Wt of empty Plate (b)                            | Kg      | 0.78          | 0.748      |
| 4     | Final weight of plate after application of tack Coat (c) | Kg      | 0.803         | 0.771      |
| 5     | Weight of tack Coat (d=c-b)                              | Kg      | 0.023         | 0.023      |
| 6     | Rate of spread of tack coat                              | Kg/sq.m | 0.256         | 0.256      |
| 7     | Average                                                  | Kg/sq.m | 0.256         |            |
| 8     | Specified Limit                                          | Kg/sq.m | 0.250 Kg/sq.m |            |

*AE-02*

*AE-2*



FOR CIVIL Pro.  
R KARTHIK RECHAN  
Authorized Signatory  
Quality Manager

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